REMARKS

The abstract and specification have been amended in order to correct grammatical and idiomatic errors contained therein. No new matter has been added.

The claims have been amended in order to more particularly point out and distinctly claim the subject matter Applicants regard as the invention. Specifically speaking, Claim 1 has been canceled and replaced by newly presented Claim 11 which more particularly points out and distinctly claims the subject matter which Applicants regard as the invention. Newly presented Claims 12-15 are directed to specific embodiments of the present invention. No new matter has been added.

Claims 1 and 2 have been rejected under 35 USC 102(b) as anticipated by or, in the alternative, under 35 USC 103(a) as being obvious over Morley et al. Claims 1-5 have been rejected under 35 USC 103(a) as being unpatentable over Hasegawa et al in view of Morley. Applicants respectfully traverse these grounds of rejection and urge reconsideration in light of the following comments.

The presently claimed invention is directed to an aqueous aluminum brazing composition comprising a zinc-based flux, an organic binder combining a (meth)acrylate copolymer containing at least one carboxyl group-containing monomer, a (meth)acrylic acid/(meth)acrylate copolymer emulsion in an amount of 0.03-1.50 wt.%, based on 100 wt.% of the brazing composition, and a reaction inhibitor for inhibiting a reaction between zinc and a carboxyl group in the organic binder or the copolymer emulsion. The weight average molecular weight of the copolymer in the emulsion is more than one digit greater than that of the copolymer of the organic binder and the brazing composition has a thixotropic index of 1.01-1.20.

Conventional aqueous aluminum brazing compositions containing a zinc-based flux have problems of being prepared

by adding a zinc-based flux to an aqueous solution of an organic binder in which a carboxyl group in the organic binder is essential to obtain the aqueous solution of an organic binder but the viscosity of the aqueous aluminum brazing composition increases due to a chemical reaction between the carboxyl group in the organic binder and the zinc powder and the specific gravity of the zinc-based flux in the brazing composition is extremely large so that the flux precipitates within several hours after preparation of the brazing composition, which makes uniform application of the brazing composition difficult.

The present invention was arrived at in order to overcome the problems discussed above with aluminum brazing compositions containing an organic binder including a carboxyl group and a zinc-based flux. In the present invention, a (meth)acrylic acid/(meth)acrylate copolymer emulsion is added as the precipitation inhibitor in an amount of from 0.03-1.5 wt.%, based on 100 wt.% of the brazing composition, and the weight average molecular weight of the copolymer which makes up the precipitation inhibitor is greater than that of the organic binder so that a suitable thixotropic viscosity is provided to the brazing composition. Additionally, a reaction inhibitor which inhibits a reaction between the zinc and a carboxyl group in the organic binder is also required. As a result, the problems associated with conventional aqueous aluminum brazing compositions containing an organic binder with a carboxyl group and a zinc-based flux are overcome. It is respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

The Morley et al reference discloses an aluminum product having excellent brazing characteristics having at least one flat surface coated with a brazing flux composition comprising a brazing flux and a synthetic resin base, as its main constituent, such as a methacrylate homopolymer or a methacrylate copolymer. In this reference, only a (meth)acrylate is listed and the presence of (meth)acrylic

acid is not disclosed. It is known that if the carboxyl group containing synthetic resin is mixed with the reactive flux of this reference, such as a zinc-based flux, the viscosity of the brazing flux composition increases due to a chemical reaction between the carboxyl group in the flux and the synthetic resin. Therefore, (meth)acrylic acid is not contained in the synthetic resin of this reference. In contrast thereto, the present invention requires that the aluminum brazing composition contain a (meth)acrylic copolymer including at least one carboxyl group-containing monomer as well as a (meth)acrylic acid/(meth)acrylate copolymer emulsion to overcome the problem of the viscosity of the brazing composition being increased due to a chemical reaction between the carboxyl group and the synthetic resin in the flux. Morley et al clearly does not disclose the presently claimed composition and, as such, it is respectfully submitted that the presently claimed invention clearly is patentably distinguishable thereover.

The Hasegawa et al reference discloses a water-based binder used in the manufacture of aluminum brazed products. The water-based binder is produced through the saponification of an ester methacrylate polymer that has an acid value and a glass transition temperature within specified ranges. In this reference, the viscosity of the flux composition does not increase because the flux does not react with the carboxyl group in the organic binder. The precipitation of the flux in the flux composition does also not occur because the specific gravity of the flux is not large. The problems dealt with in the present invention are not suggested in this reference and Hasegawa et al has no suggestion with respect to modifying the primary reference in a manner that would yield the presently claimed invention. As such, Hasegawa et al in combination with the primary Morley et al reference does not even present a showing of prima facie obviousness under 35 USC 103(a).

Although the references cited by the Examiner do not present a showing of prima facie obviousness under 35 USC

103(a), on pages 24-43 of the present specification, numerous examples of the present invention and comparative examples which are closer to the present invention than the disclosure of the references cited by the Examiner are presented. A review of the examples and comparative examples clearly establishes the criticality of the component composition of the aqueous aluminum brazing composition of the present invention when comparing the properties thereof against the compositions of the comparative examples. This further establishes the patentability of the presently claimed invention over the prior art cited by the Examiner.

The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,

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